

## Garmin GPS and ArcView

Updated to Version 4.3 – 4/5/04

## GPS for Ologists Course

March 30, 2004; May 20, 2004

National Park Service, Alaska Support Office, GIS Team

Anchorage Alaska –

This powerpoint presentation is designed to work within an 8-hour Garmin for Ologists Course. This PowerPoint is

Essentially 4 classes in one:

- 1) An Overview of DNRGarmin and what it does Slides 1-7
- 2) Complete stepxbystep installation instructions and Setup for installing Version 4.3 and a Garmin Map76. Slides 8 – 23.

Special emphasis on setting Projection paramters to DecimalDegree NAD27 (common in Alaska NP's).

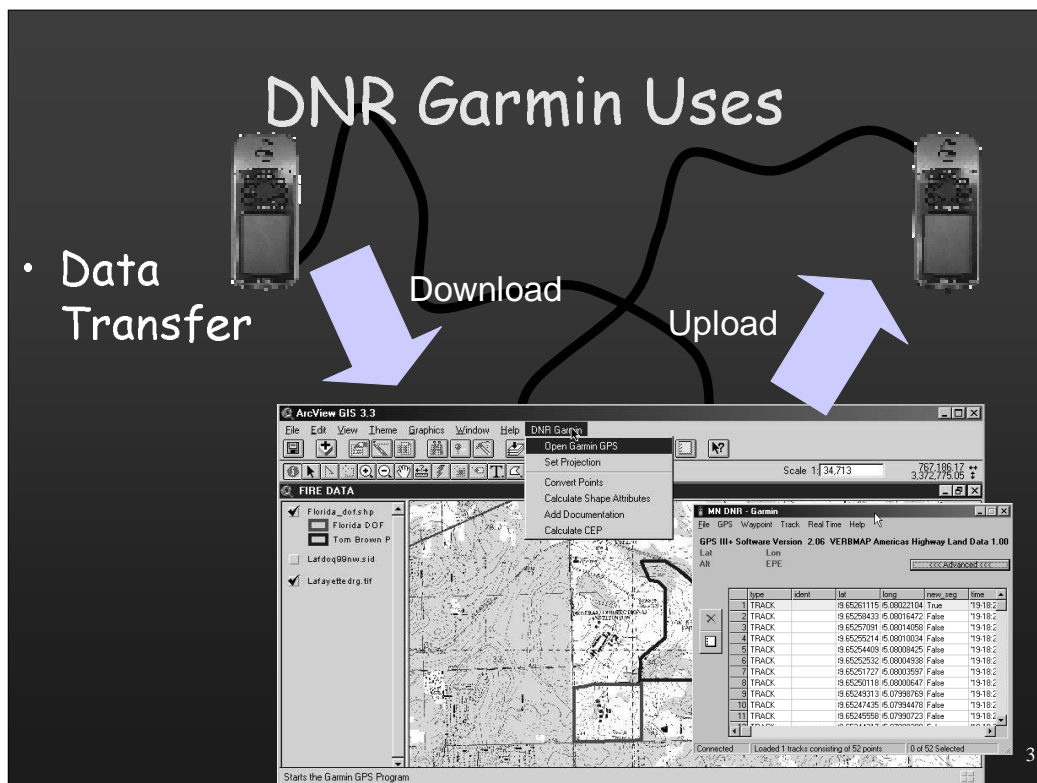
- 3)Download Session – Completion of Exercise 1. Slides 24 - 33
- 4) Upload and a Download Session - Pre-field Exercise 2, Post-field Exercise 2. Slide 35 – 57.
- 5) Slides 61 to End are additional Features.

## Objectives

- Overview of DNR Garmin Software
- DNR Garmin: Installation and Setup
- *Post Field Exercise 1*
  - Steps to Download Waypoints and Tracks to ArcView
- *Pre-Field Exercise 2*
  - Steps to Upload Waypoints and Tracks to ArcView
- *Post Field Exercise 2*
  - Steps to Download Waypoints and Tracks

**Repeat**

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• Principle of Operation in this Class is to use DNRGarmin inside of ArcView.

• Transfer of data out of the Garmin is considered Download. Using the DNRGarmin Interface as a stepping stone for viewing and editing of waypoint and track data.

• A Save step to save data inside ArcView

• This program also can reverse the process and allow transfer of ArcView shapefile data back into a Garmin - this is our focus for Navigation Exercise 2.

## DNR Garmin

- Overview

- Developed by Minnesota Dept. of Natural Resources
- Integrates ESRI's ArcView 3.x software with all types of Garmin brand GPS receivers.
- Comprised of a Visual Basic (VB) program and an ArcView extension
  - VB: DNRGarmin program (\*.exe) communicates with GPS via a serial port allowing for transfer of waypoints and tracks
  - ArcView Extension: Allows for working in ArcView for shapefile / graphic creation

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### Overview

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Integrates ESRI's ArcView 3.x software with all types of Garmin brand GPS receivers.

Comprised of a Visual Basic (VB) program and an ArcView extension

VB: DNRGarmin program (\*.exe) communicates with GPS via a serial port allowing for transfer of waypoints and tracks

ArcView Extension: Allows for working in ArcView for shapefile / graphic creation

## DNR Garmin

- Overview cont.
  - Can work independently of ArcView and save to any projected or unprojected shape!
  - Don't need ArcView
  - Available from Internet or your Training CD
    - Training CD: /Software/DNRGarminV4
    - Internet\*
- Alaska NPS Standard for 02', 03' and 04'



\*TIP <http://www.dnr.state.mn.us/mis/gis/tools/arcview/extensions/DNRGarmin/DNRGarmin.html>

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### Overview cont.

Can work independently of ArcView.

New version can save to projected or unprojected shapes outside of ArcView.

Training CD: /Software/DNRGarmin

Internet\*

# DNR Garmin Functionality Highlights

- Download / Upload Waypoints & Tracks
- Convert Waypoints to Points
- Convert Tracks to Points, Lines or Polygons
- Calculates Area, Perimeter, Length\*
- Allows for limited attribute documentation
- Image Hotlinking
- Real-Time Tracking
- Convert Line/Polygon Shapefiles back to Tracks
- Calculates Circular Error Probable (CEP)\*

**Version 4.3 is Fast!**

\* Advanced techniques demonstrated in class!

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Basic overview of main functionality -

Download / Upload Waypoints & Tracks

Convert Waypoints to Points, Lines and Polygons

Convert Tracks to Points, Lines or Polygons

Calculates Area, Perimeter, Length

Allows for Attribute documentation

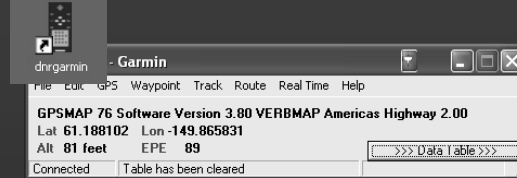
Real-Time Tracking\*

Convert Line/Polygon Shapefiles back to Tracks\*

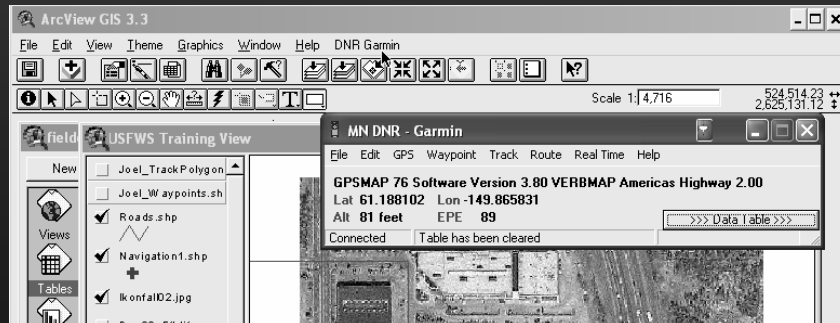
Calculates Circular Error Probable (CEP)\*

# How it Looks and Works

- Outside of ArcView



- Inside of ArcView



The DNR Garmin Extension is actually two separate programs, a VB Program and an ArcView extension. The VB Program, called DNRGARMIN.EXE is the part that communicates with the GPS receiver. The extension, DRNGarmin.AVX is used as a launching pad for the program and is also used to convert the information received into shapefiles or graphics.

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- *Pre-Field Exercise 2*
  - Steps to Upload Waypoints and Tracks to ArcView
- *Post Field Exercise 2*
  - Steps to Download Waypoints and Tracks

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### Objectives:

Open ArcView project (\*.apr) that contains a polygon and point shapefile

Use DNR Garmin to upload points to Garmin GPS III Plus receiver as waypoints

Use DNR Garmin to upload polygon to Garmin GPS III Plus receiver as tracks

Confirm upload to Garmin GPS III Plus receiver

\*Instructor will provide name of project



## INSTALLATION STEPS

- Instructor will walk through process using

<CD/Handouts/DNRGAR3AV.doc

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Handout DNRGAR3AV.doc has all the steps outlined in setting up Garmin.

## Getting Connected

- Connect Cable
- Turn on Garmin GPS
- For best results, the Garmin GPS should be connected to the computer via a serial cable and turned on before loading the DNR Garmin extension.



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### System Check

Ensure Garmin is Plugged in and On.

Should See This

- Turn Simulator On

• Press Menu, Select "Start Simulator"  
• Press Enter

The first screenshot shows the 'Acquiring Satellites' screen. It features a circular satellite status indicator with numbers 01 through 12. Below the indicator is a list of satellites: 03, 08, 15, 16, 18, 21, 22, 26, 27, 29, 31, 47. The date and time are 29-MAR-04 01:53:09. The second screenshot shows the 'Start Simulator' menu. It has options for 'North Up', 'New Elevation', and 'New Location'. Below these is a 'MENU for Main Menu' button. The date and time are 29-MAR-04 01:53:48. The third screenshot shows the 'Simulating GPS' screen. It displays a speed of 0.0 kph, elevation of 81.4 feet, and accuracy of 15.0 meters. It also shows a bar chart and coordinates N 61°11'19.2" W 149°51'49.0". The date and time are 29-MAR-04 01:55:36.

Steps to set Simulator Mode to ON

Important to alter this. Prevents GPS from asking "where is sky" and provides LAT/LONG/ EPE and Elev. To user.

- Check Interface Protocol
- Press Menu Menu | Select Setup
- From Setup Menu
- Scroll Right to Interface Tab
- Check Format is Garmin



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Connect receiver, start receiver and ensure interface is set to GARMIN.

## Install DNRGarmin

- Navigate to <CD/Software/DNRGarminV4
- Double click "dnrgarmin43setup.exe"
- Press Next
- Press Next to Accept License agreement
- Press Next to keep program defaults
- Close Wizard
- Copy the c:/program files/dnrgarmin/  
"dnrgarmin43" extension file to the ArcView  
extension folder  
C:\ESRI\AVGIS30\ARCVIEW\EXT32\

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## Getting Connected - Step 1

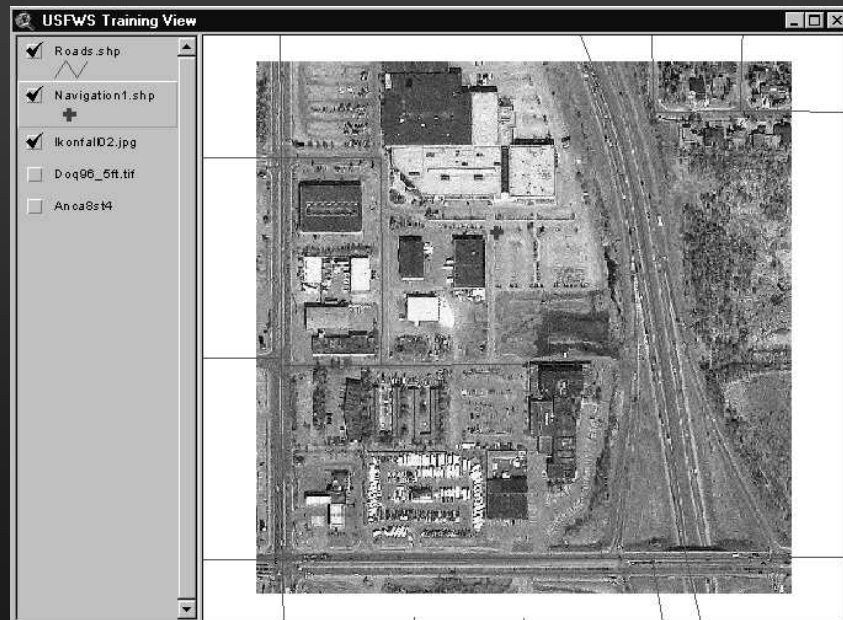
- Start ArcView
  - Double-Click DeskTop Icon
  - OR
  - Start Button | Programs | ESRI | ArcView3 | ArcView
- File | Open Project
- Navigate to:
  - C:/04GPSTRAINING/BASEDATA/  
FIELDXCERCISE1.APR



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- Step 1
- Start ArcView
- Open a pre-made ArcView Project. For Training these can be found in
  - FOR FLORIDA
    - /ACTIVE\_INCIDENT/FLORIDA\_FIRE / BASEDATA
  - FOR JOSHUA TREE
    - /ACTIVE\_INCIDENT/JOSHUA\_FIRE / BASEDATA

# SEE THIS?

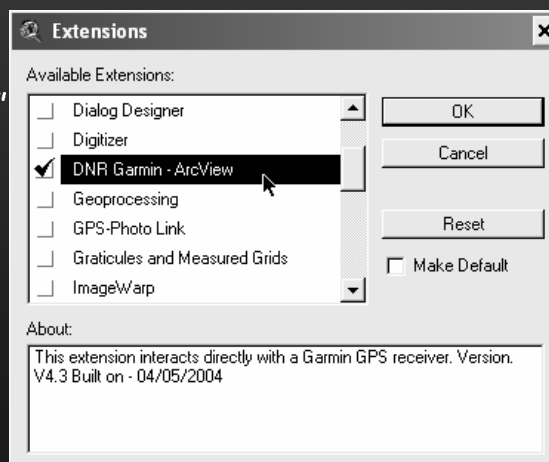


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- Step 1
- Load DNR Extension

## Turn on DNR Garmin

- Load DNR Extension
  - Select File | Extensions...
  - Scroll to Select "DNR Garmin-ArcView"
  - Press OK

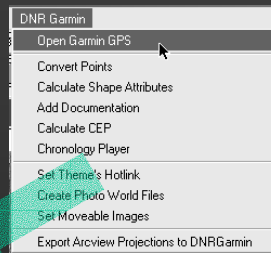




## Getting Connected - Step 2

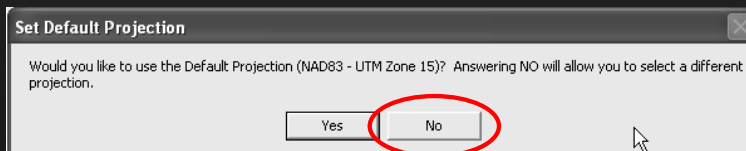
- Open Garmin GPS

- Time to Begin communication with the GPS
- Select DNR Garmin | Open Garmin GPS



- Set Projection

- If this is the first time you have run DNR Garmin on this Computer you will be asked to use the DEFAULT projection for Minnesota (NAD83-UTM Zone 15)
- Press NO

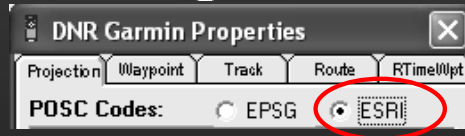


•Instructors: Once 4.2 is installed on a PC, the Windows registry will always retain the default Code and projection. You may remove them by running REGEDIT

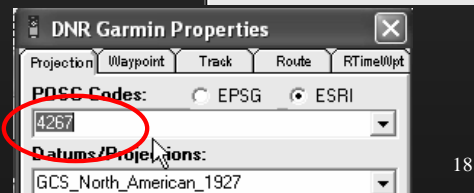
- HKEY Current User
- Software
- VB and VBA Program Settings
- DNRGarmin
- Proj
  - Delete the two settings (not default)

## Getting Connected - Step 2

- DNR Garmin Projection Properties
- Click on the ESRI Radio Button



- Type in 4267
- Press the ENTER KEY

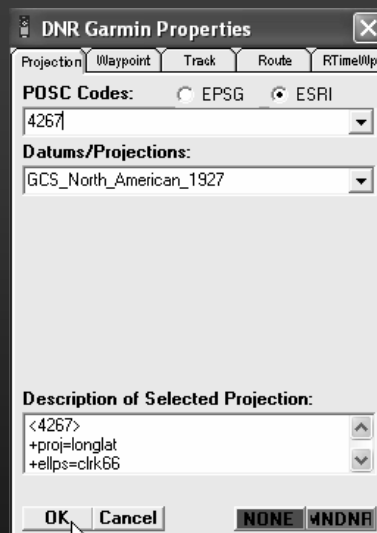


- Step 2
- Set Projection
- FL will be UTM, Zone 16, NAD83
- JOTR will be UTM, Zone 11, NAD83

**Why?** Look at your ArcView project. We named the View to remind you that the other GIS data is in this projection and datum. Every "home" unit's GIS data or every incident GIST will have data in *some* projection and datum. You need to find out what that is so your GPS data lines up!

## Getting Connected - Step 2

- You Should See This
- Once you check these Settings
- Press OK



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## Getting Connected - Step 2

- Setting Projection is THEE most important step in this process
- The Wrong Projection will result in BAD Data
- Confirm this EVERY time you start DNR Garmin
- When you install this on your own laptop back at the office, you must redo these steps...
- WHY? - DNR Garmin thinks you are in Minnesota!!!!

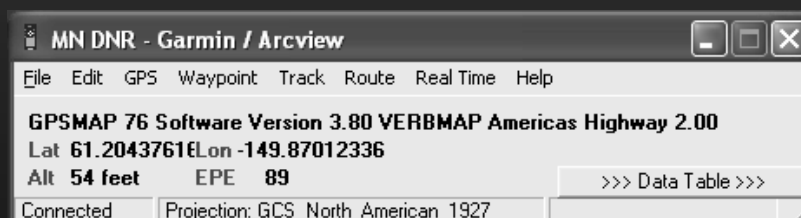
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- Step 2
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- FL will be UTM, Zone 16, NAD83
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# Open Garmin GPS

- You Should See this!
- Congratulations!

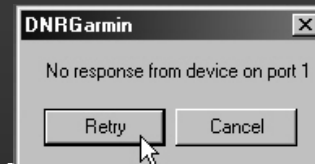


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- Step 2
- Open DNR Garmin from DNR Garmin Menu
- Should get connection.

## Troubleshooting Tips

- Check the following if connection cannot be made
    - Cable is securely attached
    - Interface on receiver is set to Garmin
  - VB Menu Option GPS
    - These options set up communication protocols with GPS
      - Select GPS | Assign Port and Select other COM port\*
      - Select GPS | Open Port to establish connection
- \* ActiveSync or other peripherals may be using same port



•Use this slide if there are difficulties in establishing connection.

•See instructor for special instructions.

DNR Installation is Complete

–Proceed to Downloading the GPS

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- *Post Field Exercise 2*
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Open ArcView project (\*.apr) that contains a polygon and point shapefile

Use DNR Garmin to upload points to Garmin GPS III Plus receiver as waypoints

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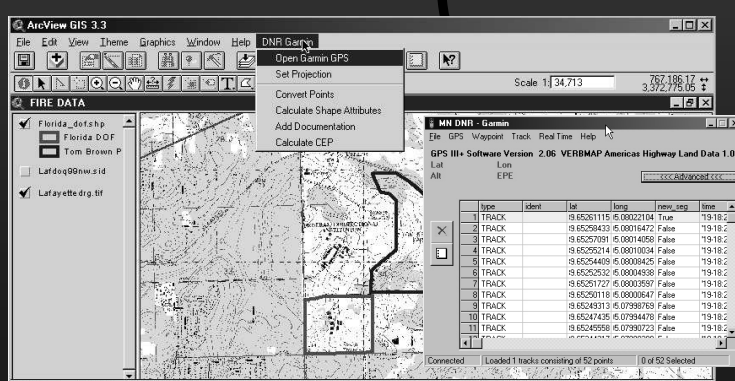
Confirm upload to Garmin GPS III Plus receiver

\*Instructor will provide name of project



# Downloading Waypoints and Tracks to ArcView

Download – EXERCISE 1

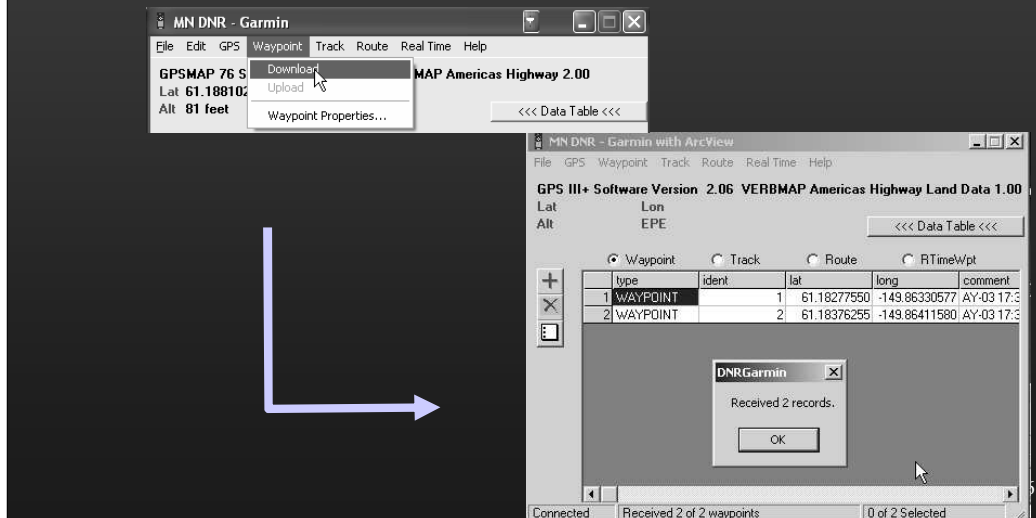



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•This will complete Exercise 1. You have waypoints and tracks in your Garmin GPS. Now is the time to download and create shapes.

# Download Waypoints into ArcView

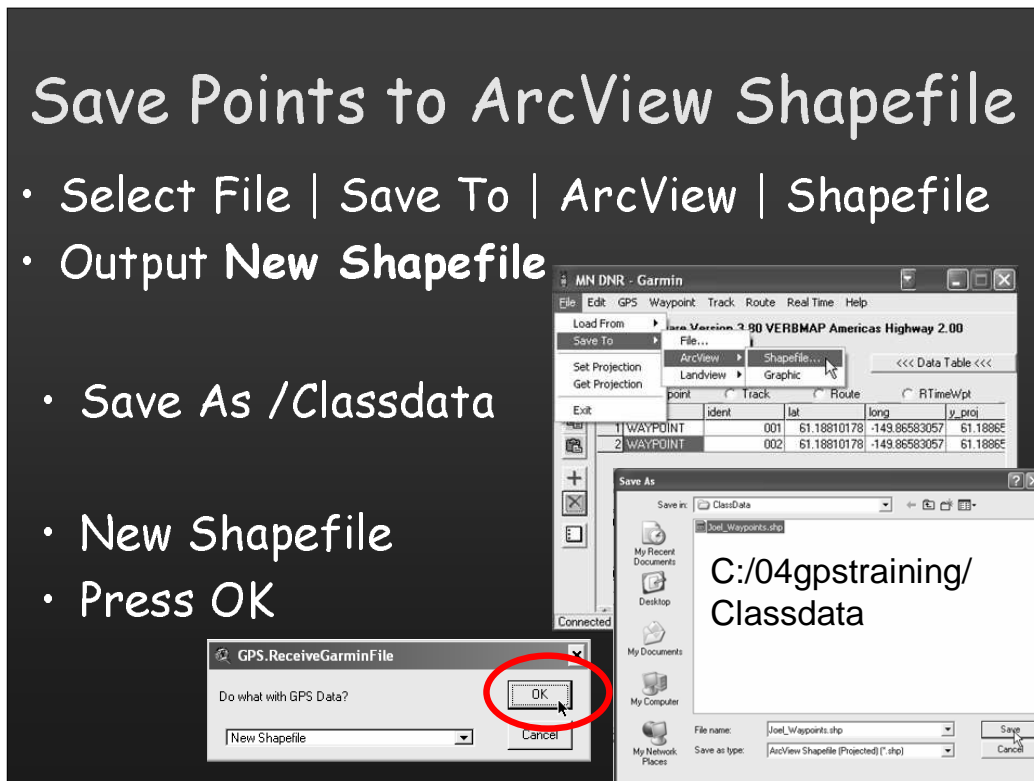
- Make the MN DNR - Garmin Screen Active
- Select Waypoint | Download



- Waypoint | Download
- Click on Advanced button to see a list of all waypoints and their attributes in a table

# Save Points to ArcView Shapefile

- Select File | Save To | ArcView | Shapefile
- Output New Shapefile
- Save As /Classdata
- New Shapefile
- Press OK



- File | Save As | ArcView Shapefile
- Give it a name using naming convention of: incident name\_date (ddmmyyyy)  
\_military time (optional)\_description (what is it and what feature type).
- Turn on theme in view legend

## Save Points to ArcView Shapefile

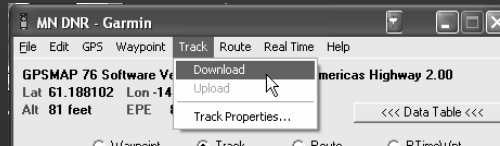
- Shapefile appears in View - Table of Contents. Turn on and Explore!



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# Download Track into ArcView

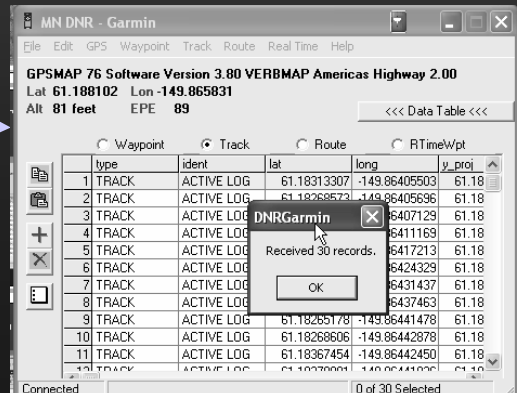
- Make MN DNR Garmin Window Active
- Select Track | Download



- TrackPoints seen in Table

What's with the blue?

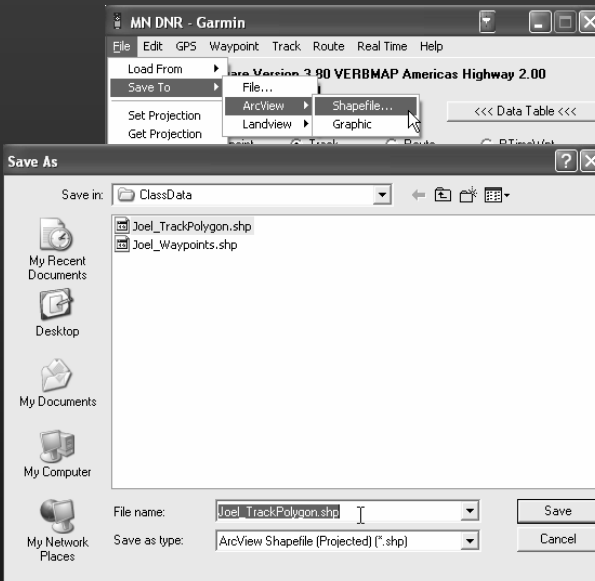
This is an indication of a "new" track. This signifies a break in sequence of track point data collection based on date and/or time.



- Next Step to Download the Garmin Tracks.
- Tracks | Download
- Advanced button to show all tracks points and attributes.
- Note that blue indicates beginning of new track. DNRGarmin decides this based on break in sequence of track point collection by date and/or time.

## Save as ArcView Shapefile

- Select File | Save To | ArcView | Shapefile...
- Save AS Shape
- Output Polygon
- Press OK



The screenshot shows the ArcView software interface. The 'Save As' dialog box is open, showing the 'Save in' location as 'ClassData'. The file list contains 'Joel\_TrackPolygon.shp' and 'Joel\_Waypoints.shp'. The 'File name' field is set to 'Joel\_TrackPolygon.shp' and the 'Save as type' is 'ArcView Shapefile (Projected) (\*.shp)'. The 'Output Shape' dialog box is also open, showing the 'Please Define the Output Shape' section with 'Line' and 'Polygon' radio buttons. The 'Polygon' button is selected and circled in red, with the 'OK' button next to it.

- File | Save As | ArcView Shapefile
- Name using some convention
- Output to Polygon
- Turn on theme in view legend

## Save as ArcView Shapefile

- Shapefile appears in View - Table of Contents. Turn on and Explore!



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## Summary

- You have installed and setup DNR Garmin for the first time.
- Downloaded waypoints and at least one tracklog from the Garmin to ArcView.
- The Polygon might not be too pretty, but there are workarounds:
  - Get better with opening/closing tracks
  - Download the track as points, select records you want to convert to poly and use DNR Garmin or Alaska Pak to convert selected records to Poly!

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## Break - End of Exercise 1

- STOP HERE
  - Close DNR Garmin
  - Close ArcView - Don't Save
- Pick up Field Exercise 2 Document and Read the Scenario
- Next Steps are to Open a New ArcView Project and Upload data

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- *Post Field Exercise 2*
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# Uploading Waypoints and Tracks to ArcView

Upload – Pre-Field EXERCISE 2

type	ident	lat	long	new_log	time
1	TRACK	45.261115	-6.00022104	True	19-18-2
2	TRACK	45.259433	-6.00016472	False	19-18-2
3	TRACK	45.257591	-6.00014056	False	19-18-2
4	TRACK	45.255214	-6.00010034	False	19-18-2
5	TRACK	45.254409	-6.00008425	False	19-18-2
6	TRACK	45.252332	-6.00004936	False	19-18-2
7	TRACK	45.251727	-6.00003587	False	19-18-2
8	TRACK	45.250118	-6.00000647	False	19-18-2
9	TRACK	45.249313	-6.07996769	False	19-18-2
10	TRACK	45.247426	-6.07994478	False	19-18-2
11	TRACK	45.245956	-6.07990723	False	19-18-2

•This will complete Exercise 1. You have waypoints and tracks in your Garmin GPS. Now is the time to download and create shapes.

## Exercise 2 - Main Steps

- Clear All waypoints and tracks from Garmin
- Upload Waypoints and Tracks to ArcView
- Go Outside with Exercise 2 Objectives

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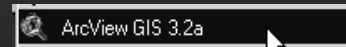
## Getting Ready for Upload

- Clear All waypoints from Garmin
  - Menu Menu | Points | Waypoints | Menu | Delete All | Confirm
- Clear All Active Tracks from Garmin
  - Menu Menu | Tracks | Enter
  - Toggle Right | Clear | Confirm
- Make sure Track Recording is Off
- Menu | Setup Track Log
- Make Sure Record Mode is OFF



## Open ArcView

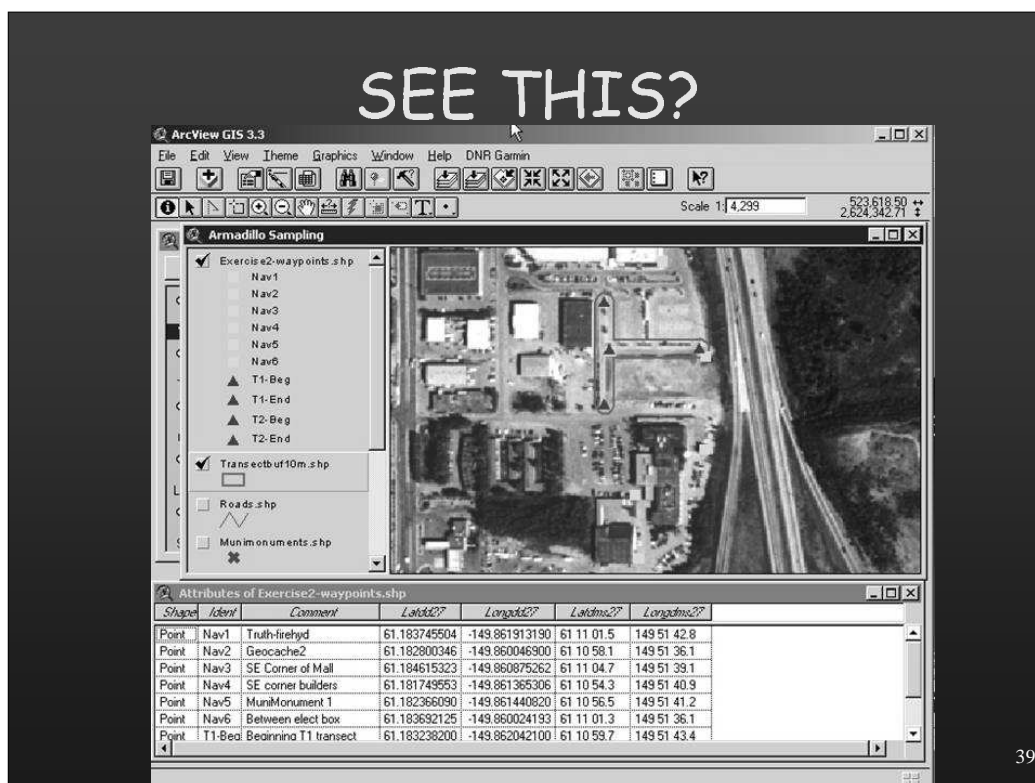
- Start ArcView
  - Double-Click DeskTop Icon
- OR
- Start Button | Programs | ESRI | ArcView3 | ArcView



- File | Open Project
- NAVIGATE TO:
- C:/04GPSTraining/BASEDATA/  
**FIELDXCERCISE2.APR**

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- Step 1
- Start ArcView
- Open a pre-made ArcView Project. For Training these can be found in
- For Ologists:
- C:/04gpstraining/basedata/field excercise2.apr

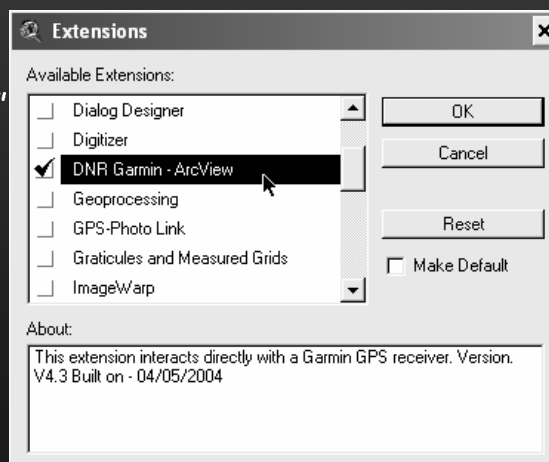


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•Wait until Class sees this

## Turn on DNR Garmin

- Load DNR Extension
  - Select File | Extensions...
  - Scroll to Select "DNR Garmin-ArcView"
  - Press OK

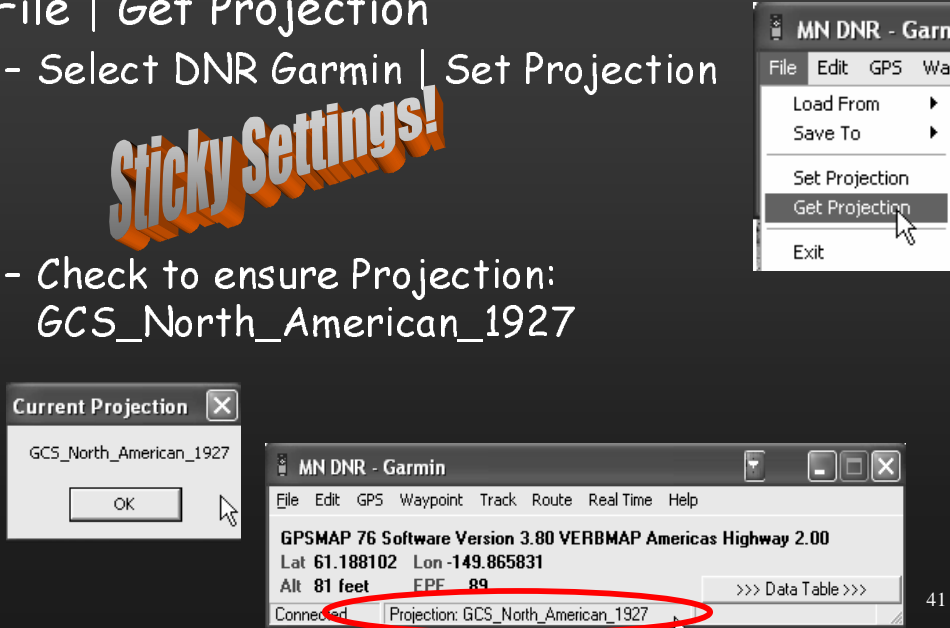




# Always Check Projection

- File | Get Projection
  - Select DNR Garmin | Set Projection
- Check to ensure Projection:  
*GCS\_North\_American\_1927*

**Sticky Settings!**



The screenshot shows the 'MN DNR - Garmin' software window. The 'File' menu is open, and 'Get Projection' is highlighted. Below it, a 'Current Projection' dialog box shows 'GCS\_North\_American\_1927' with an 'OK' button. In the main software window, the status bar at the bottom shows 'Projection: GCS\_North\_American\_1927', which is circled in red. The software version is 'GPSMAP 76 Software Version 3.80 VERBMAP Americas Highway 2.00'. The coordinates are 'Lat 61.188102 Lon -149.865831' and 'Alt 81 feet FPE 89'.

- Step 2
- Set Projection
- For NPS use NAD27

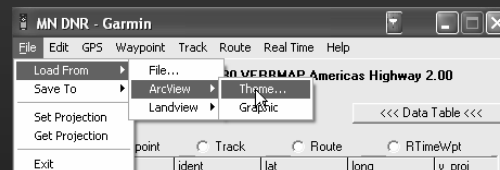
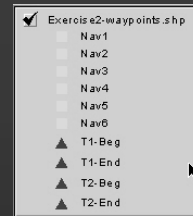
## Reminder

- For NON NPS personnel, your projection settings may differ.
- USFWS: May be Alaska Albers or UTM Zone X
- BLM: May be Alaska Albers
- Check with your GIS Specialist!



# Waypoint Upload

- Make Point Theme Active
- File | Load From | Arcview | Theme
- If the point theme isn't active you will see this message →



## Waypoint Upload: Step 1- from ArcView shapefile to DNRGarmin waypoints

Make Point Theme Active

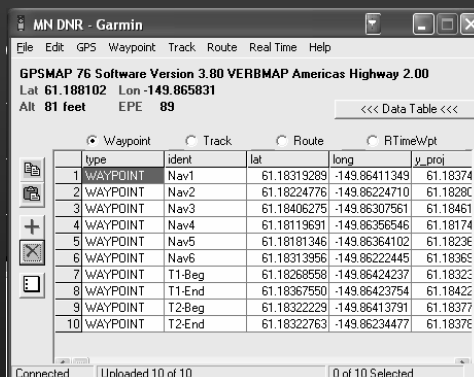
File | Load | Waypoints From| ArcView Theme

STOP error if the theme isn't active

# Waypoint Upload

- Confirm 10 waypoints are in Data Table

- Select Waypoint | Upload



MN DNR - Garmin

File Edit GPS Waypoint Track Route Real Time Help

GPSMAP 76 Software Version 3.80 VERBMAP Americas Highway 2.00

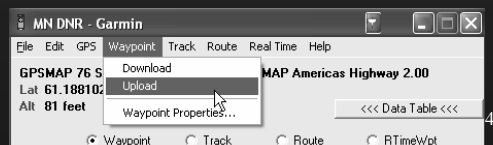
Lat 61.188102 Lon -149.865831

Alt 81 feet EPE 89

<<< Data Table >>>

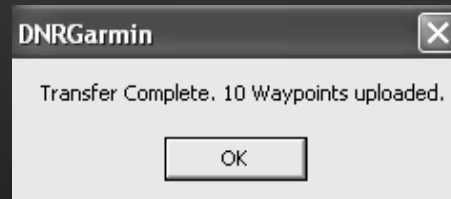
	type	ident	lat	long	y_proj
1	WAYPOINT	Nav1	61.18319289	-149.86411349	61.18374
2	WAYPOINT	Nav2	61.18224776	-149.86224710	61.18280
3	WAYPOINT	Nav3	61.18406275	-149.86307561	61.18461
4	WAYPOINT	Nav4	61.18119691	-149.86356546	61.18174
5	WAYPOINT	Nav5	61.18181346	-149.86364102	61.18236
6	WAYPOINT	Nav6	61.18313956	-149.86222445	61.18365
7	WAYPOINT	T1-Beg	61.18268558	-149.86424237	61.18323
8	WAYPOINT	T1-End	61.18367550	-149.86423754	61.18422
9	WAYPOINT	T2-Beg	61.18322229	-149.86413791	61.18377
10	WAYPOINT	T2-End	61.18322763	-149.86234477	61.18376

Connected Uploaded 10 of 10 0 of 10 Selected



## Waypoint Upload Into Garmin

- Press OK To Confirm 10 Waypoints Uploaded to Garmin



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## Waypoint Upload Into Garmin

Since Fields IDENT and COMMENT exist in shapefile DNRGarmin knew what to assign in Attribute table.

- The waypoint IDENT is limited to 6 characters - so this is what you would see in the Waypoints menu
- The COMMENT box holds up to 16 characters

Waypoint

NAV3

SE CORNER OF MAL

Location

N 61°11'04.6"  
W 149°51'39.1"

Elevation 0' Depth 0.0'

☒ Show Name on Maps

Delete Map

Goto OK

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Select CANCEL for IDENT field to be sequential numbers in DNRGarmin table, which becomes name of waypoint in receiver

Option: select a field from the shapefile to give a more descriptive name to the waypoint name in the receiver. E.g., name or label. You are limited to 6 characters

# Waypoint Upload Into Garmin

## WARNING!

- When you upload waypoints, any waypoint in the GPS that has the same ID name as the uploading waypoint will be overwritten.
- Although this is not an issue today, it may happen to you!

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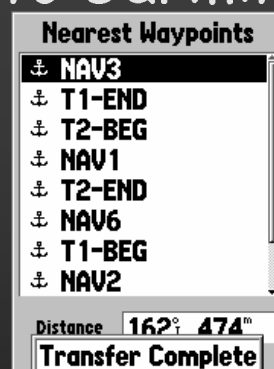
## WARNING!

When you upload waypoints, any waypoint in the GPS that has the same ID name as the uploading waypoint will be overwritten.

Although this is not an issue today, it may happen on a fire!

## Waypoint Upload Into Garmin

- Message Displayed in Garmin GPSMap 76
- Go into Waypoints Menu to view Waypoint List
- Congratulations!



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This is what you will see in your receiver once the upload is finished!

Go into the Waypoints Menu to see a list of your waypoints

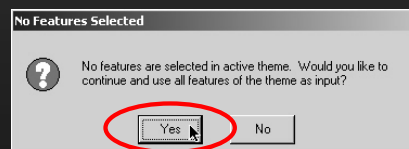
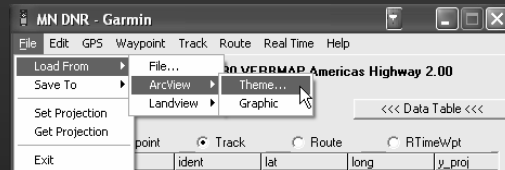
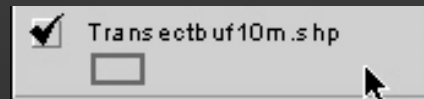


# Track Upload

- Make Polygon Theme Active

- File | Load From | Arcview | Theme...

- All features will load unless you select individual polygons



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## Track Upload: Step 1- from ArcView shapefile to DNRGarmin track

Make polygon theme active

File | Load | Tracks From| ArcView Theme

Note: you could select individual polygons if you want OR if none are selected the whole shapefile will load.

## Track Upload

- Select Sequential ID for the IDENT Field
- Press OK
- Confirm 30 Track Points Loaded into Data Table

### Track Upload: Step 2 - DNRGarmin track to receiver track

Click on the ADVANCED button

Loaded X tracks with X track points will display down at the bottom of window

Track | Upload

Transfer Complete message will pop up, click ok

Review - 2 steps

1. Load Tracks from shapefile - this puts the shapefile into DNRGarmin as tracks (with trackpoints).

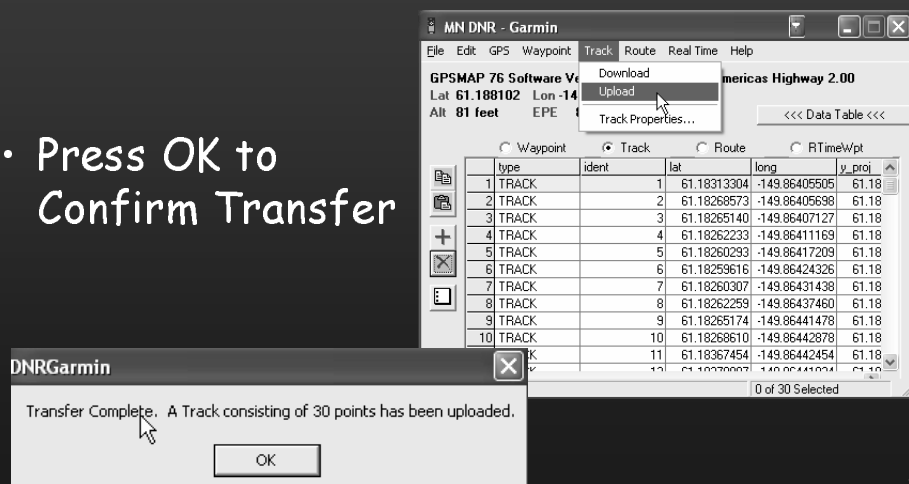
2. Upload tracks - this uploads the tracks from DNRGarmin to receiver

Note: Blue display for some track points in DNRGarmin table is an indication of the beginning of “separate” tracks. DNRGarmin makes this assessment with distance between series of track point collections and/or time of collection. Pretty smart software huh!?

## Track Upload into Garmin

- Select Track | Upload

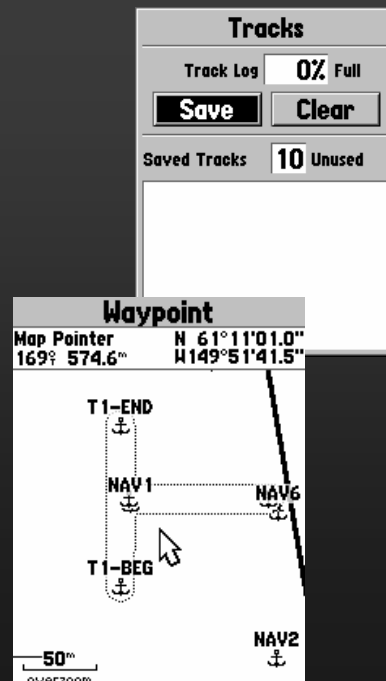
- Press OK to Confirm Transfer



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# Track Upload Into Garmin

- Press MENU MENU select Tracks
  - Because Track memory is so large, 0% shows
- Go to map page to see display of waypoints and tracks
  - Press Page
- Congratulations!
- You're ready to navigate!



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This is what you will see in your receiver once the upload is finished!

Go into the Track Logs Menu to see % of active log used.

Go into the Map Page to see the tracks (and waypoints).

## Summary - Exercise 2 Pre-field

- Opened ArcView project that contained a point and polygon shapefile
- Used DNR Garmin to upload points to Garmin receiver as waypoints
- Used DNR Garmin to upload polygon to Garmin receiver as a series of track points stored in an ACTIVE TrackLog
- Confirmed upload to Garmin GPSMap 76 receiver

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### Summary:

Opened ArcView project that contained a polygon and point shapefile

Used DNR Garmin to upload points to Garmin receiver as waypoints

Used DNR Garmin to upload polygon to Garmin receiver as tracks

Confirmed upload to receiver

## Next Step - Exercise 2

- Using the Field Exercise 2 Form
- Close Down
  - the Garmin
  - DNR Garmin & ArcView
- Be sure you have all the equipment
- Meet out at Truth! (NAV1)



## Field Exercise 2

- Back from the Field

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- Using the steps in this powerpoint,
- SLIDES 25 - 31
- Download and verify the Exercise 2 Data using the third ArcView project provided for you....



## Exercise 2 - Post Field

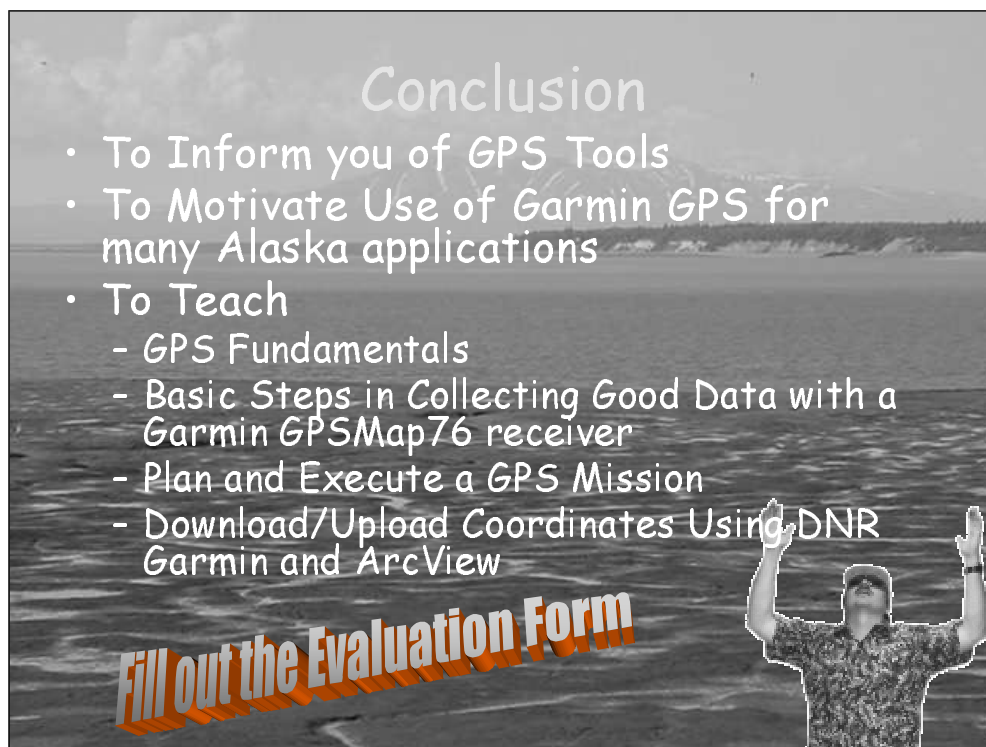
- Quick Steps
  - Open postfieldexercise2.apr
  - Download Waypoints to ArcView
    - Transfer only waypoints you collected
  - Download Tracks to ArcView
    - Transfer only Tracks you collected
    - Download as Lines
  - Calculate migration distances for Armadillos
  - Calculate Density of Armadillos inside Transect Area (number of Animals / Area)

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## Last But Not Least

- Datum Bust
- Garmin Accuracy - LIVE DEMO

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**Conclusion**

- To Inform you of GPS Tools
- To Motivate Use of Garmin GPS for many Alaska applications
- To Teach
  - GPS Fundamentals
  - Basic Steps in Collecting Good Data with a Garmin GPSMap76 receiver
  - Plan and Execute a GPS Mission
  - Download/Upload Coordinates Using DNR Garmin and ArcView

**Fill out the Evaluation Form**

## DNR Garmin

- Other DNR Garmin Quirks and Features we will not have time to discuss in Class

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## DNR Garmin Quirks

- Since NPS works with Decimal Degree Data (not projected) there are some items that need clarification
  - 1) Chronology Player will not work with DD data.
  - 2) Shape Attribute Calculations will not work with DD data
- Simply use DNRGarmin with projected data and your fine.

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## Other Features

### How to Speed Up Downloads

New to 4.3!

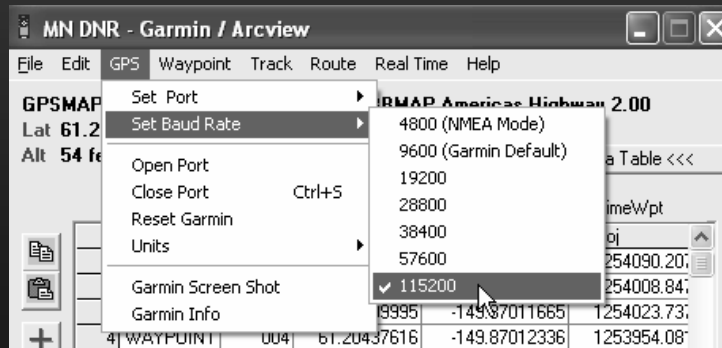
- New to Version 4.3 is increased data transfer speeds.
- Previous versions operated only at 9600 baud - now you can set the baud rate up to 11520!
- Tracks will download 10X faster
- Now offers Alaska Albers NAD27!

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# Other Features

## How to Speed Up Downloads

- Here 's how
  - Select GPS |Set Baud Rate |
    - Change to 115200
  - Download as before



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## Other Features

### Independent Projection Engine

Proj.4 - Open source projection engine developed by Gerald Evenden of the USGS. Used by:

- Grass
- Mapserver
- PostGIS
- Do not need Arcview to Open/Save projected shapefiles.
- Now offers Alaska Albers NAD27!

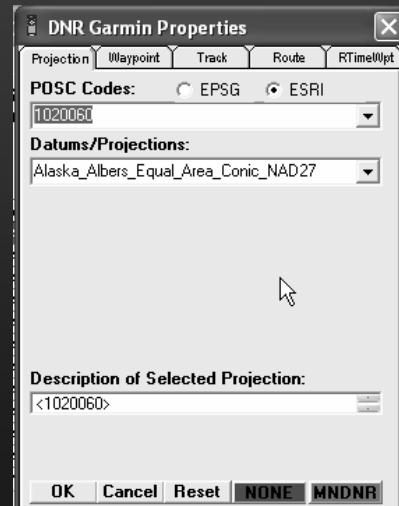
**New to 4.3!**

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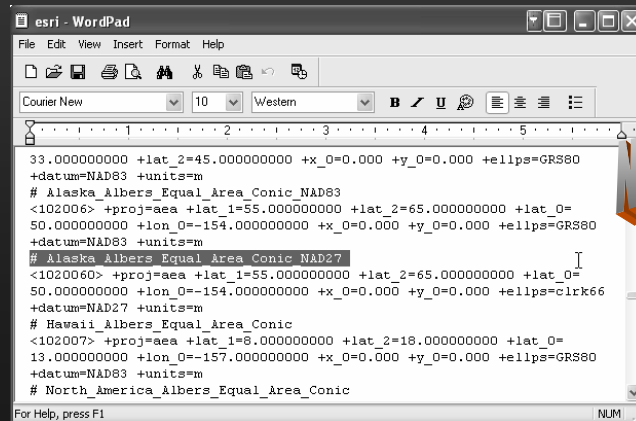
## Projection - Version 4.3 now comes with Alaska Albers NAD27 - The Alaska Standard

- You can now directly project out shapes in the Alaska Albers NAD27 projection.
- Previous versions we had to enter the values
- Go to Set | Projection
- Type in The ESRI code 1020060
- You will still need to create a PRJ file



## Projection -Alaska Albers 27

- Here is a look at the entry in the  
C:\Program  
Files\dnrgarmin\proj\nad\esri file



```
esri - WordPad
File Edit View Insert Format Help
Courier New 10 Western B I U
33.0000000000 +lat_2=45.0000000000 +x_0=0.000 +y_0=0.000 +ellps=GRS80
+datum=NAD83 +units=m
# Alaska_Albers_Equal_Area_Conic_NAD83
<102006> +proj=aea +lat_1=55.0000000000 +lat_2=65.0000000000 +lat_0=
50.0000000000 +lon_0=-154.0000000000 +x_0=0.000 +y_0=0.000 +ellps=GRS80
+datum=NAD83 +units=m
# Alaska_Albers_Equal_Area_Conic_NAD27
<1020060> +proj=aea +lat_1=55.0000000000 +lat_2=65.0000000000 +lat_0=
50.0000000000 +lon_0=-154.0000000000 +x_0=0.000 +y_0=0.000 +ellps=clrk66
+datum=NAD27 +units=m
# Hawaii_Albers_Equal_Area_Conic
<102007> +proj=aea +lat_1=8.0000000000 +lat_2=18.0000000000 +lat_0=
13.0000000000 +lon_0=-157.0000000000 +x_0=0.000 +y_0=0.000 +ellps=GRS80
+datum=NAD83 +units=m
# North_America_Albers_Equal_Area_Conic
```

New to 4.3!

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## Projection - Adding a Custom projection

- Go to C:\Program Files\dnrgarmin\proj\nad
- Open the ESRI file with a text editor.
- You can directly edit in any custom projection information.
- Merely copy and paste a line of code
- Save file when done

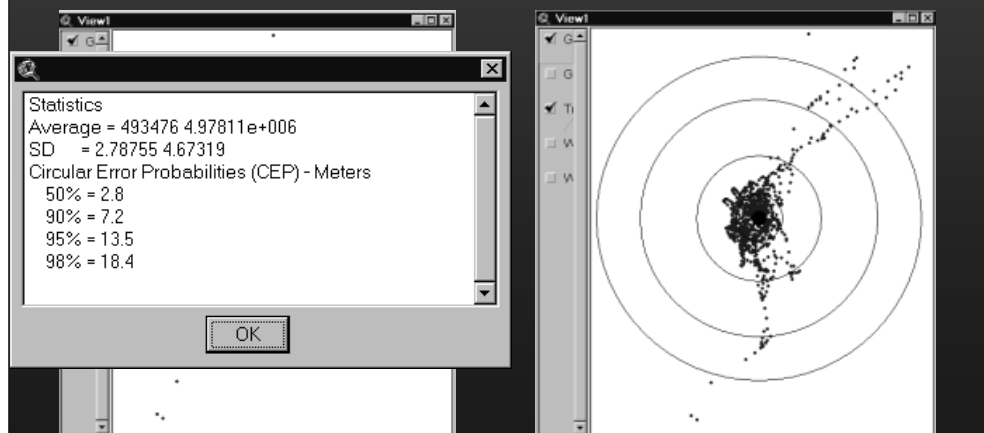
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## Other Features

### Calculate CEP

#### Circular Error of Probability

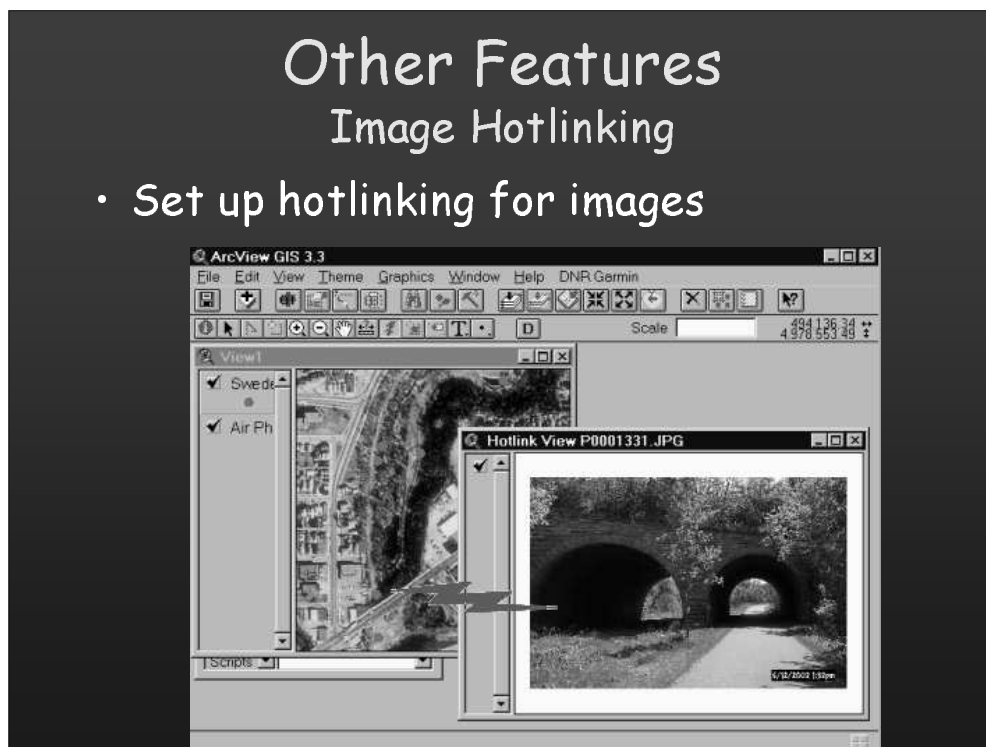
- Use to determine the accuracy of your GPS at a given location at a given time of day.



## Other Features

### Image Hotlinking

- Set up hotlinking for images



## Other Features

### Image Location Manipulation



## Other Features Image Location Manipulation

